Name:

at1124exam: Radicals and Squares (v0)

Question 1

Simplify the radical expressions.

$\sqrt{75}$ $\sqrt{8}$ $\sqrt{99}$

$\sqrt{5 \cdot 5 \cdot 3}$ $\sqrt{2 \cdot 2 \cdot 2}$ $\sqrt{3 \cdot 3 \cdot 11}$

$5\sqrt{3}$ $2\sqrt{2}$ $3\sqrt{11}$

Question 2

Find all solutions to the equation below:

$$\frac{(x-6)^2}{2} + 6 = 38$$

First, subtract 6 from both sides.

$$\frac{(x-6)^2}{2} = 32$$

Then, multiply both sides by 2.

$$(x-6)^2 = 64$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 6 = \pm 8$$

Add 6 to both sides.

$$x = 6 \pm 8$$

So the two solutions are $x = 14$ and $x = -2$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 14x = -40$$

$$x^2 - 14x + 49 = -40 + 49$$
$$x^2 - 14x + 49 = 9$$
$$(x-7)^2 = 9$$
$$x - 7 = \pm 3$$
$$x = 7 \pm 3$$
$$x = 10 \quad \text{or} \quad x = 4$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 4x^2 - 24x + 29$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 - 6x) + 29$$

We want a perfect square. Halve -6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 - 6x + 9 - 9) + 29$$

Factor the perfect-square trinomial.

$$y = 4((x-3)^2 - 9) + 29$$

Distribute the 4.

$$y = 4(x-3)^2 - 36 + 29$$

Combine the constants to get **vertex form**:

$$y = 4(x-3)^2 - 7$$

The vertex is at point $(3, -7)$.